

#25/appeal  
11/4/03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re U.S. Patent Application of

Jau-Yuen SU et al.

Application Number: 09/394,918

Filed: September 13, 1999

For: PROCESS FOR SAWING  
SUBSTRATE STRIP

) Group Art Unit: 3724

) Examiner: Omar FLORES-SANCHEZ

) Confirmation No.: 5130

) Attorney Docket: SUJA3001/WKP  
) Customer No.: 23364

Hart

APPELLANT'S BRIEF UNDER 37 C.F.R. §1.192

MAIL STOP APPEAL BRIEF-PATENTS

Honorable Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This paper is an Appeal Brief in furtherance of the Notice of Appeal filed in this case on July 28, 2003. The fee required under 37 C.F.R. §1.17(f) accompanies this Appeal Brief, along with a one-month Extension of Time.

This Brief contains these items under the following headings and in the order set forth below:

- I. Real Party In Interest
- II. Related Appeals And Interferences
- III. Status of Claims
- IV. Status of Amendments
- V. Summary of Invention
- VI. Issues
- VII. Grouping of Claims
- VIII. Arguments
- IX. Conclusion
- X. Appendix of Claims Involved in the Appeal

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## **I. Real Party In Interest**

The real party in interest is the assignee, Advanced Semiconductor Engineering, Inc. of Kaohsiung, Taiwan, R.O.C. An assignment of the application from the Appellants, Jau-Yuen Su, Tao-Yu Chen and Su Tao, was recorded on September 13, 1999 at reel 010258, frame 0070.

## **II. Related Appeals And Interferences**

There are no related appeals or interferences.

## **III. Status of Claims**

The status of the claims in this application is:

### **A. Status of all the claims**

1. Claims canceled: 1-6, 8 and 13
2. Claims withdrawn from consideration: None
3. Claims pending: 7 and 9-12
4. Claims allowed: None
5. Claims objected to: None
6. Claims rejected: 7 and 9-12

### **B. Claims on Appeal:**

The claims on appeal are: 7 and 9-12

## **IV. Status of Amendments**

An amendment after final rejection was filed on June 26, 2003, subsequent to the final rejection dated February 26, 2003. In an Advisory Action dated July 15, 2003, the Examiner indicated that the amendment would be entered for purposes of this appeal. Thereafter, an interview with the Examiner and Applicant's Attorney took place on July 17, 2003, and on July 21, 2003 Applicant submitted proposed amendments to independent claim 7 in accord with the earlier interview for the purpose of getting the application allowed, but the proposed amendments to claim 7 was not entered by the Examiner.

## V. Summary of the Invention

The invention involves a substrate sawing process for cutting substrate areas on a substrate strip, while minimizing the accumulation of cutting error.

More specifically, the claimed invention involves a modification of the prior art process for cutting substrate areas, as illustrated in Figure 1 of the application. In the prior art process illustrated in Figure 1 and the Description of the Related Art of the application, a substrate strip 100 is provided with substrate areas 110 along the longitudinal length thereof. The substrate areas 110 are provided with alignment marks 111 at corners thereof. Cutting marks 112 are provided along portions of the outer peripheries of the substrate areas 110, as illustrated in Figure 1 of the application. Thereafter, a saw device is aligned to a single set of alignment marks 111 of a single substrate area 110 (i.e. the left-most substrate area 110 of Figure 1 of the application). The saw device utilizes opposing ones of the cutting marks 112 of the single substrate area 110 to create cutting tracks 101 parallel to the lateral axis of the substrate strip 100 for all of the substrate areas 110 on the substrate strip 100. Since the cutting tracks 101 for all of the substrate areas 110 on the substrate strip 100 are formed by the alignment of opposing ones of the cutting marks of only a single one of the substrate areas 110, the cutting error "A" can easily accumulate on to subsequent substrate areas 110, as the saw device makes its cuts along the cutting tracks 101 at subsequent substrate areas 110.

As illustrated in Figure 2 of the application, the claimed invention is a major improvement over the prior art, in that the cutting error "A" will not accumulate to subsequent substrate areas 110, as the saw device makes its cuts along the cutting tracks 101. The elimination of the cutting errors is accomplished as follows. Initially the saw device is aligned to a single set of alignment marks 111 of a first substrate area 110 (i.e., the left-most substrate area on the substrate strip of Figure 2 of the

application). Opposing cutting marks 112 of the first substrate area 110 are utilized by the cutting or saw device to set only the cutting tracks 101, with regard to only a first substrate area. In the embodiment illustrated in Figure 2 of the application, the cutting tracks 101 that are initially formed are perpendicular to the longitudinal length of the substrate strip 110. Then the saw device is repositioned to an adjacent substrate area by aligning itself to the alignment marks 111 of the adjacent substrate area. Thereafter, the process of creating the cutting tracks 101 is repeated for each individual substrate area, as the saw device is sequentially repositioned to adjacent substrate areas. Therefore, the cutting error "A" that would otherwise exist in the prior art, is dramatically reduced or eliminated.

As illustrated in Figure 3 of the application, in the second phase of the cutting process, the saw device measures or predetermines the cutting tracks 102 by using the cutting marks 112 of each of the substrate areas 110 and the cutting tracks 102 are restricted in each of the substrate areas 110, and the substrate strip 100 is cut along the cutting tracks 101 and the cutting tracks 102 to form the substrate of a semiconductor device (page 5, lines 5-9 of the original specification).

The reduction in cutting error is of critical importance because the substrate strip is initially subjected to high temperature, and when the substrate strip 100 returns to normal temperature, shrinkage in all dimensions occurs. However, each substrate strip 100 has its own unique variability which results in different dimensional amounts of shrinkage for the individual substrate strips when returning from a high temperature to a normal temperature. Therefore, even if the substrate strips 100 are subjected to the same processes and made of the same material, the shrinkage characteristics of each individual substrate strips will be different (page 1, lines 20-25 of the specification).

## **VI. Issues**

The issues involved in this Appeal are:

- 1.) whether the subject matter of claims 7 and 9-11 is anticipated under 35 USC §102(e) by the subject matter disclosed in U.S. Patent No. 6,219,912 (Shimizu et al.), and
- 2.) whether the subject matter of claim 12 is rendered obvious under 35 USC §103(a) by the subject matter disclosed in U.S. Patent Nos. 6,219,912 (Shimizu et al.) and 6,047,470 (Drussel et al.).

## **VII. Grouping of the Claims**

Appellants most respectfully submit that each of claims 7 and 9-12 do not stand or fall together.

## **VIII. Arguments**

1. Rejection of Claims 7 and 9-11 Under 35 U.S.C. §102(e) in view of U. S. Patent No. 6,219,912 (Shimizu et al.)

MPEP § 2131 states that to anticipate a claim, the reference must teach every element of the claim. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed.Cir. 1990).

The reference to Shimizu et al. discloses a method of forming positioning signs 18, 18a at the same time as the electrode pads 4a by photolithography using the same

mask pattern (column 13, line 43 - column 14, line 4), in order to improve the positional accuracy of the positioning signs, thereby improving the accuracy of the cut lines 2 relative to the positions of the electrodes pads 4a, since the cut lines are made between opposing pairs of positioning signs.

In the claimed invention, as illustrated in figures 2 and 3 and described in the detailed description of the specification, independent claim 7 claims a process for sawing a substrate strip (100) having substrate areas (110) by a saw machine. The process comprises the steps of providing alignment marks (111) around each individual substrate area (110) on the substrate strip (100) and providing cutting marks (112) around each individual substrate area on the substrate strip (100); and positioning the saw machine with respect to each individual substrate area in accordance with the alignment marks (111) there around.

Thereafter, each individual substrate area (110) on the substrate strip (100) is cut by the saw machine respectively according to cutting tracks (101) defined by the cutting marks (112).

The substrate strip (100) has a longitudinal axis and a lateral axis and the substrate areas (110) are disposed along the longitudinal axis, and the saw machine is positioned with respect to a first substrate area (110) according to the alignment marks (111) along the longitudinal axis from one side thereof and cuts the substrate strip (100) according to cutting tracks (101) defined by the cutting marks (112) parallel to the lateral axis.

A key step in the claimed invention is the repositioning of the saw machine with respect to an adjacent one of the substrate areas (110) and cutting the substrate strip, whereby cutting error that results from each substrate area will not accumulate to the subsequent substrate areas in the substrate strip.

The Examiner has equated the positioning signs 18a of Shimizu et al. (Figure 3A) to the alignment marks 111 of the claimed invention, and reference element 2 of Shimizu et al. (Figure 3A) to the cutting marks 112 of the claimed invention. The

positioning signs 18a of Shimizu et al. can not be equated to the alignment marks 18a of the claimed invention, nor can the cut lines 2 of Shimizu et al. be equated to the cutting marks 112 of the claimed invention.

In the claimed invention, the alignment marks 111, around each individual substrate area 110 are utilized only by the saw machine to position itself over a respective substrate area 110. Thereafter, the saw machine utilizes the cutting marks 112, not the alignment marks 111, to form cutting tracks 101, along which the cuts are made, as shown in Figure 2 of the application. The alignment marks 111 of the claimed invention is used for the sole purpose of guiding the saw machine to an individual substrate area 110, and is not utilized to form any cutting tracks or cut lines. Thus the specific elements of the claimed invention are not taught by the reference to Shimizu et al.

Further, there is no disclosure in the reference to Shimizu et al. for repositioning a saw machine to individual substrate areas that are formed along a substrate strip by sequentially aligning itself to the claimed alignment marks that are around the periphery of each of the substrate areas and using the cutting marks of each of the substrate areas to form cutting tracks along which cuts are made. This process is repeated in which the saw machine travels or is repositioned to an adjacent substrate area and aligns itself to the alignment marks of the adjacent substrate area. The step of repositioning the saw machine with respect to an adjacent one of the substrate areas (110) and cutting the substrate strip, whereby cutting error that results from each substrate area will not accumulate to the subsequent substrate areas in the substrate strip, is not taught by the reference to Shimizu et al., which does not specify the manner in which the cutting device could be repositioned, if at all. The reference to Shimizu et al. does not disclose an equivalent to the alignment marks 111 of the claimed invention that are utilized for the sole purpose of guiding a saw machine over individual substrate areas 110.

The Examiner has equated the cut lines 2 of Shimizu et al. to the cutting marks 112 of the claimed invention. With regard to the cut lines 2 of Shimizu et al., this can

only be equated to the cutting tracks 101 of the claimed invention, which unlike the reference to Shimizu et al. is formed by aligning opposing cutting marks 112, as illustrated in Figure 2 of the application. The cut lines 2 of Shimizu et al. can not be equated to the cutting marks 112 of the claimed invention because the cut lines 2 of Shimizu et al. are predetermined or imaginary lines along which cuts are made (Figure 3A), whereas the cutting marks 112 of the claimed invention are actual, substantive marks positioned around each substrate area 110. The cut lines 2 of Shimizu et al. could only be remotely be comparable to the cutting tracks 101 of the claimed invention, which perform a similar function.

The reference to Shimizu et al does not disclose an equivalent to the alignment marks 111 of the claimed invention that guides a sawing machine to an individual substrate area 110. The alignment marks 111 of the claimed invention can not be equatable to the positioning signs 18a of Shimizu et al, nor can the cutting marks 112 of the claimed invention be equated to the cut lines 2 of Shimizu et al.

Claim 9 includes the further step of cutting the substrate strip (100) according to cutting tracks defined by the cutting marks (112) parallel to the longitudinal axis, as shown in Figure 2 of the application. Thus there is a two-step process for cutting the substrate strip. The reference to Shimizu et al. does not specifically teach such a two-step process for cutting the substrate strip, but recites that cutting is made along the cut lines 2 (column 13, lines 55-62).

Claim 10 recites that each individual substrate area (110) is provided with at least three alignment marks, as shown in Figure 2. Claim 11 is similar to claim 10 in that the "substrate area" is replaced with "encapsulated area", as described in the original specification (page 4, lines 14-17). With regard to claims 9 and 10, the alignment consists of at least three points arranged around the encapsulated or substrate area of the substrate. As previously stated, there is no equivalent to the claimed alignment



marks in the reference to Shimizu et al.

Because the Shimizu et al. reference teaches only positioning signs 18a, which can only remotely be compared to the cutting marks 112 of the claimed invention, and neither discloses any equivalent to the alignment marks 111 of the claimed invention, nor a method of aligning a sawing device according to the alignment marks initially, and thereafter forming cutting tracks according to opposing ones of the cutting marks, and then repositioning the sawing device to an adjacent substrate area according to the alignment marks of the adjacent substrate area, the Shimizu et al. reference cannot be an anticipating reference under 35 U.S.C. § 102. The Shimizu et al. reference teaches only a method of forming positioning signs via photolithography in order to improve the accuracy of the cuts made between the positioning signs, and is not concerned with any means for first guiding a sawing device to a particular individual substrate area and repositioning the sawing device to an adjacent substrate area. In the absence of any equatable alignment marks that guide the sawing device to individual substrate areas in sequence and the step of repositioning the sawing device to an adjacent substrate area according to alignment marks on the adjacent substrate area, the reference to Shimizu et al. cannot anticipate the claimed invention, and reversal of the rejection of claims 7 and 9-11 is respectfully requested.

**2. Rejection of Claim 12 Under 35 U.S.C. §103(a) in view of U. S. Patent No. 6,219,912 (Shimizu et al.) and U.S. Patent No. 6,047,470 (Drussel et al.)**

MPEP § 2131 states that to establish a prima facie case of obviousness, three basic criteria must be met. First there must be some suggestion or motivation, either in the prior art references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine the teachings of the reference. Second, there must be a reasonable expectation of success for the

modification. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

Further, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

MPEP § 2143.03 states that all claimed limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art". *In re Wilson* 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an independent claim is non-obvious under 35 U.S.C. § 103, then any claim depending therefrom is non-obvious. *In re Fine* 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Claim 12 recites that two substrate strips are juxtaposed for cutting simultaneously, as illustrated in Figure 4 and described in page 5, lines 10-14 of the original specification.

Reversal of this rejection is respectfully requested on the grounds that the Drussel et al. patent, like the Shimizu et al. patent, fails to disclose or suggest, whether considered individually or in any reasonable combination, alignment marks around each individual substrate area on the substrate strip, which is utilized by a cutting machine to position itself on a respective one of the substrate areas on the substrate strip according to the alignment marks, thereafter cutting the substrate strip according to cutting tracks defined by the cutting marks parallel to the lateral axis of the substrate strip, and repositioning itself to an adjacent substrate area, as recited in claim 7, from which claim 12 depends from.

The Examiner alleges that the reference to Shimizu et al. discloses the method substantially as claimed except for two substrate strips juxtaposed for cutting. As previously argued, the reference to Shimizu et al. can not anticipate all of the elements of independent claim 7, and is therefore deficient with regard to claims 7 and 9-11.

The Examiner alleges that the reference to Drussel et al. teaches the use of a method of using two substrate strips juxtaposed for cutting for the purpose of increasing production. The reference to Drussel et al. does not provide for the missing elements of Shimizu et al., in order to obviate any of the pending claims, including claim 12.

Figure 5 of Drussel et al. discloses a stack of circuit board substrate assemblies that may be singulated or cut at the same. The dictionary definition of the word "juxtaposed" is to place close together or side-by-side. As inferred from Figure 4 of the application, the meaning of the word "juxtaposed" is to place side-by-side, and not to stack the substrate strips. There is no disclosure in the reference to Drussel et al. to place the equatable substrate strips side-by-side.

Even if one were to find support to place the substrate strips side-by-side in the reference to Drussel et al., all of the claimed elements of independent claim 7 from which claim 12 depends from, are not satisfied by the base reference to Shimizu et al., alone or in combination with the reference to Drussel et al.

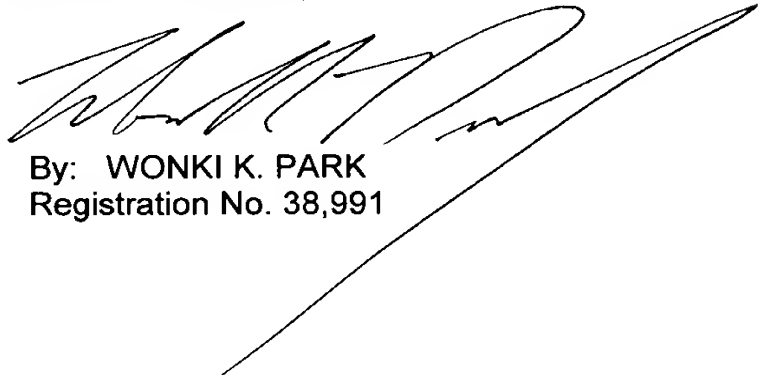
Because neither the Shimizu et al. nor Drussel et al. references discloses or suggests the claimed process for sawing a substrate strip, reversal of the rejection of claim 12 under 35 U.S.C. § 103(a) is respectfully requested.

**IX. Conclusion**

For all of the foregoing reasons, Appellants respectfully submit that the Examiner's final rejections of claims 7 and 9-12 under 35 U.S.C. §§ 102 (e) and 103(a) are improper and should be reversed by this Honorable Board.

Respectfully submitted,

BACON & THOMAS, PLLC

A handwritten signature in black ink, appearing to read 'W. K. Park', is written over the printed name and registration number.

By: WONKI K. PARK  
Registration No. 38,991

Date: October 28, 2003

BACON & THOMAS  
625 Slaters Lane, 4th Floor  
Alexandria, Virginia 22314

Telephone: (703) 683-0500

X.

## APPENDIX OF CLAIMS

1-6 (Canceled)

7. A process for sawing a substrate strip having a plurality of substrate areas by a saw machine, and the process comprising the steps of:

providing a plurality of alignment marks around each individual substrate area on the substrate strip;

providing a plurality of cutting marks around each individual substrate area on the substrate strip;

positioning the saw machine with respect to each individual substrate area in accordance with the alignment marks there around;

cutting each individual substrate area on the substrate strip by the saw machine respectively according to cutting tracks defined by the cutting marks;

wherein the substrate strip has a longitudinal axis and a lateral axis and the substrate areas are disposed along the longitudinal axis, the saw machine is positioned with respect to a first substrate area according to the alignment marks along the longitudinal axial from one side thereof and cuts the substrate strip according to cutting tracks defined by the cutting marks parallel to the lateral axis;

repositioning the saw machine with respect to an adjacent one of the substrate areas; and

cutting the substrate strip, whereby cutting error that results from each substrate area will not accumulate to the subsequent substrate areas in the substrate strip.

8. (Canceled)

9. The process as claimed in claim 7, further comprising the step of cutting the substrate strip according to cutting tracks defined by the cutting marks parallel to the longitudinal axis.

10. The process as claimed in claim 7, wherein each individual substrate area is provided with at least three alignment marks.

11. The process as claimed in claim 7, further comprising an encapsulated area on each individual substrate area, and the encapsulated area is provided with at least three alignment marks there around.

12. The process as claimed in claim 7, wherein two substrate strips are juxtaposed for cutting simultaneously.

13. (Canceled)